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## Subclinical Depression and Anxiety in Adolescence: Developmental Trajectories and Online Intervention

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## Summary





Depression and anxiety are the most commonly occurring mental disorders in adolescence with a substantial impact on the individual level. Many adolescents report subclinical symptoms of depression and anxiety, and are at increased risk of developing a depressive or anxiety disorder. Early detection and intervention of depression and anxiety are therefore of high importance. A difficulty in this respect, however, is the reluctance of most adolescents to seek professional help for their depressive and anxiety symptoms if these have not been perceived as causing severe impairment. Web-based delivery of preventive interventions may be more accessible to these adolescents than face-to-face help. As described in *Chapter 1*, the general goal of this thesis is to provide more insight in the development and online intervention of depression and anxiety in adolescence. Questions are aimed at the simultaneous development of depression and anxiety over the course of adolescence and its association with undesirable outcomes, the feasibility and perceived barriers to participation of a web-based preventive intervention for depression and anxiety in adolescents, as well as the efficacy of two web-based interventions for reducing symptoms of depression and anxiety.

*Chapter 2* describes a study which was aimed to identify gender-specific groups of adolescents with distinct longitudinal profiles of depression on the one hand and anxiety on the other over the course of early adolescence, and the relation of these profiles with changes in a set of characteristics deemed important in adolescence. Based on a sample of 497 adolescents (56.9% males), depression/anxiety trajectories from age 13 to age 16 were identified for females and males separately. For females, three trajectory classes were identified which all reflected patterns of comorbidity including low decreasing depression and anxiety, moderate increasing depression and stable anxiety, and high increasing levels of depression and anxiety. For males, three depression/anxiety trajectories were identified: low decreasing depression and anxiety, low decreasing depression and moderate decreasing anxiety, and high decreasing depression and anxiety. Findings indicate that it is very unlikely that depression occurs without anxiety symptoms in the general adolescent population, and vice versa, across early adolescence. This implicates that for research regarding aetiology and treatment of depression and anxiety, it may not be important to consider these syndromes as distinct in early adolescence. For clinical practice, the results suggest that there may be no strong need for differential treatment approaches for adolescents with depressive or anxiety symptoms. While increases in depression or anxiety symptoms appeared in the two highest trajectories for females, all male trajectories showed a decrease in internalizing symptomatology. Subsequent analyses revealed that externalizing behavior and self-concept ambiguity were higher among adolescents in the elevated depression/anxiety groups. Achievement in school, truant behavior and substance use did not differentiate any of the trajectory classes.

*Chapter 3* presents the findings regarding non-participation in our PST web-based intervention trial, and consequently the generalizability of findings to the wider population. Socio-demographics, intervention expectations, and health-related data were collected on participants (n=36) and non-participants (n=45), and barriers for participation were

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examined among non-participants. Less than one-fifth of interested adolescents eventually decided to participate in our preventive intervention study for depression and anxiety. Immigrants were fairly underrepresented, and participants reported less depressive symptoms than non-participants. The main barriers for participation as reported by non-participants were the obligation of parental consent, considering other treatments, too mild or too severe symptoms to participate, and time investment. Many adolescents reported to have participated in the trial when they would have received an incentive. Findings suggest that we may have excluded adolescents who are at particularly high risk of internalizing symptoms though not receiving any treatment because of a lack of support from parents/friends/family and perceived parental consent barriers. Although we sought to construct a low-threshold intervention, we inadvertently constructed a process that was unfeasible and difficult for adolescents. This study raises a fundamental question about the external validity of findings from Internet-based intervention efficacy trials for depression and anxiety in adolescents.

*Chapter 4* describes the design of the randomized controlled trial in which Internet-based PST was compared with a waiting list control group. Recruitment of participants took place via press releases, advertisements via magazines and via the Internet, school counsellors, and mental health institutions. Exclusion criteria were too severe depressive (CES-D > 42) or anxiety (HADS-A > 14) symptoms or suicidal intentions (BDI suicide item > 1). Participants were randomly assigned to one of the two conditions using block randomization. Internet-based PST was based on Self-Examination Therapy and consisted mainly of problem solving procedures. PST took five weeks with one lesson a week. All participants received weekly support by e-mail. Measurements were taken at baseline and at 3, 5, 16 weeks and 4, 8 and 12 months after baseline. All questionnaires were administered online. Primary outcomes were depressive and anxiety symptoms as measured with the CES-D and HADS-A, respectively.

*Chapter 5* presents efficacy results of preventive Internet-based (guided) self-help Problem-Solving Therapy (PST) for adolescents reporting mild to moderate symptoms of depression and/or anxiety as compared to a waiting list control group. A total of 45 participants were randomized to the two conditions. Self-report measures of depression and anxiety were filled in at baseline and after three weeks, five weeks and four months. Of the 45 participants, 28 (62.2%) completed questionnaires after three weeks, 28 (62.2%) after five weeks and 27 (60%) after four months. Hierarchical linear modeling analyses revealed overall improvement over time for both groups on depressive and anxiety symptoms. However, no significant group x time interactions were found, and thus it cannot be concluded that guided self-help PST had the intended effect. No differences were found between completers and non-completers. In conclusion, results show that depressive and anxiety symptoms declined in both groups, but Internet-based PST was not effective in reducing depression and anxiety in comparison to the waiting list control group. The small sample size and high drop-out of participants precluded meaningful interpretation of this finding. More research is required to ascertain what intervention content, amount, timing

and duration of delivery is most effective and for which group of adolescents, as well as the potential of Internet-based interventions for adolescents with internalizing symptoms.

*Chapter 6* concerns six-month results of a randomized comparison of two approaches to engage adolescents to an Internet intervention: (1) primary care physician (PCP) motivational interviewing (MI), where the physician seeks to help the adolescent to identify his/her own motivation for engaging the Internet program (internal motivation), and (2) PCP brief advice (BA), where the physician directs the adolescent to the Internet program based on his or her authority (external motivation). 84 participants were recruited by screening for risk of depression in 13 primary care practices in the United States. Depressive disorder outcomes were compared between groups and within groups over 6 months, and potential predictors and moderators of outcomes across both study arms were examined. Both intervention groups demonstrated substantial declines in depression symptoms that were sustained at six months after treatment. No significant interactions with treatment condition were found. However, by six months, the cumulative prevalence of clinically significant depressive episodes and prevalence of hopelessness were significantly lower in the MI group than the BA group. Hierarchical linear modeling regressions showed that higher ratings of Internet site ease of use were associated with lower levels of depressed mood over six months. A primary care/Internet-based intervention model among adolescents demonstrated reductions in depressed mood over six months and may result in fewer depressive episodes.

In conclusion, the results of this thesis showed that depression and anxiety develop concurrently over the course of early adolescence, whereby a reasonable number of girls reported moderate to severe depressive and anxiety symptoms by the age of 13. Moreover, our study demonstrated difficulties in recruiting adolescents for a randomized controlled trial investigating the efficacy of a web-based intervention for depression and anxiety. No support is provided for the use of this web-based problem-solving therapy, but the study may have had inadequate power to demonstrate effects. Motivational interviewing may be a feasible method of engaging adolescents with an Internet-based depression prevention program. Guided Internet-based treatment for depression and anxiety represents an alternative to traditional forms of psychotherapy for adolescents. Implications of the results, main limitations and suggestions for future research are presented in *Chapter 7*.